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## Evaluation of a Tool to Predict 90-Day Readmission or Death Following Hospitalization for COPD

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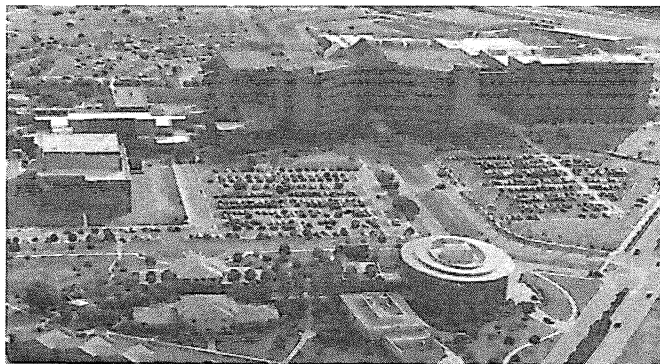
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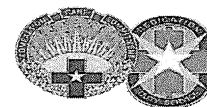
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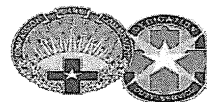


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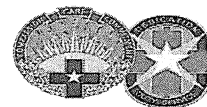
- Identify components of the PEARL score
- Assess patients for risk of readmission for COPD



## Background

### COPD exacerbation admissions

- High degree of morbidity and mortality
  - 1/3 of patients readmitted within 90 days
  - Extensive cost on the medical system
- Clinicians don't accurately identify risk of readmission
  - Most tools focus on death or health status
  - Prognostic tool for readmission is needed



## PEARL Score

- Previous admissions (2+)
- Extended Medical Research Council Dyspnoea Scale (eMRCD)
- Age (80+)
- Right-sided heart failure
- Left-sided heart failure



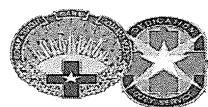
## eMRCD vs. mMRC

eMRCD	mMRC
1 – Breathless with strenuous exercise	0 – Breathless with strenuous exercise
2 – Breathless when hurrying on level or walking up slight hill	1 – Breathless when hurrying on level or walking up slight hill
3 – Walks slower than peers or stops walking at own pace	2 – Walks slower than peers or stops walking at own pace
4 – Stops after 100m or for after a few minutes on level	3 – Stops after 100m or for after a few minutes on level
Too breathless to leave house and: 5a – independent in washing/dressing 5b – dependent in washing/dressing	4 – too breathless to leave house or breathless when dressing/undressing

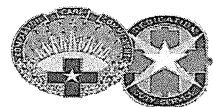


## PEARL Score

PEARL Indices	Weight
2+ previous admissions	3
eMRCD 4	1
eMRCD 5a	2
eMRCD 5b	3
Age 80+	1
Right ventricular failure	1
Left ventricular failure	1



Risk	PEARL Score	% Risk Readmission
Low	0-1	20.7
Intermediate	2-3	42.1
High	5-9	66.4



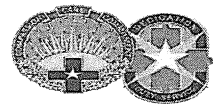
## Purpose:

- Evaluate PEARL using the mMRC score in place of eMRCD

## Objectives:

**Primary:** The ability of modified PEARL to predict risk of readmissions and death at 90 days

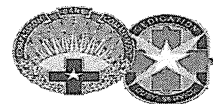
**Secondary:** The ability of modified PEARL to predict risk of readmissions and death at 30 days



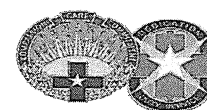
- Retrospective study
  - Assess modified PEARL score for COPD exacerbation admissions to SAMMC
- Inclusion Criteria
  - Patients admitted to SAMMC with a diagnosis of acute COPD exacerbation
  - Patients over 18 years old
  - Patients evaluated between 1 Jan 2016 and 30 Sep 2017



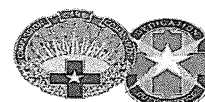
- Exclusion Criteria
  - Patients under the age of 18
  - Patients already included in the study



- Chart review via electronic health record
- Data collected from health records included:
  - Age at admission, sex, military status
  - mMRC and GOLD as assessed at last outpatient visit
  - Long-term, oxygen, steroids, and institutional care status
  - Smoking history (pack-years)
  - ABG pH < 7.35
  - Length of stay
  - Number of admissions in the last year



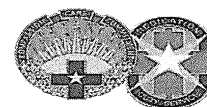
- Additional Data collected from health records included:
  - Cor pulmonale diagnosis
  - Left ventricular failure diagnosis
  - Previous stroke/TIA diagnosis
  - Diabetes, atrial fibrillation, CKD, asthma diagnoses
  - Cognitive impairment diagnosis
  - If readmitted within 30 or 90 days
  - If death within 30 or 90 days
- Data compiled in Microsoft Access®
- Statistical tests performed with Stata® version 14



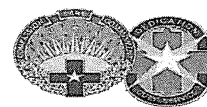
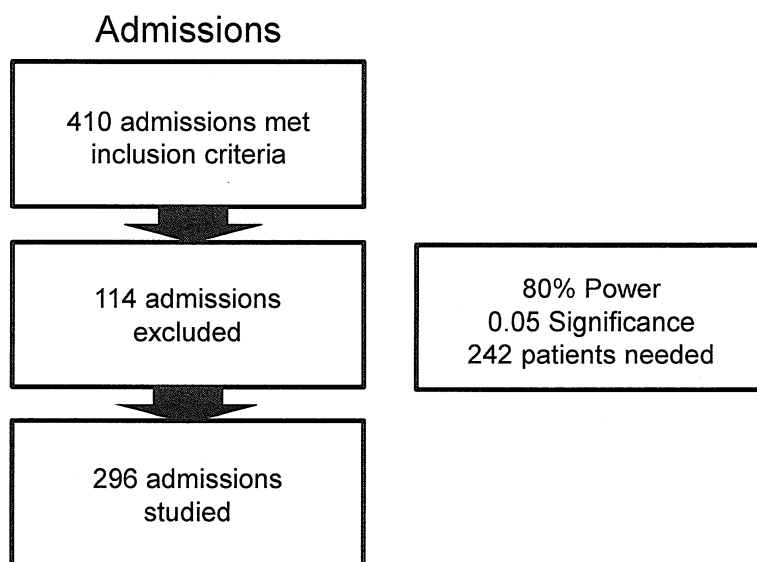


## Methods

- Statistical assessment will be run twice
  - First with mMRC 4 assessed as eMRCD 5a
  - Second with mMRC 4 assessed as eMRCD 5b
- Imputation will be used for missing data
- Chi-square to compare PEARL risk assessment
  - Level of significance 0.05
  - Two-sided comparison



## Methods



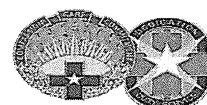


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## Descriptive Statistics

	Patients
Males	172 (58.3%)
Median age (yrs)	74
Cor pulmonale	7 (2.4%)
Left ventricular Failure	74 (25.0%)
Long Term Care	13 (4.4%)
Diabetes	100 (33.8%)
Chronic Kidney Disease	42 (14.2%)
Stroke or TIA	18 (6.1%)



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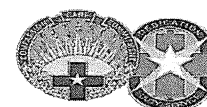
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## Descriptive Statistics

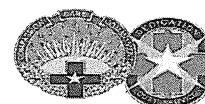
	Patients
Atrial Fibrillation	66 (22.3%)
Atrial Fibrillation	66 (22.3%)
Asthma	34 (11.5%)
Cognitive Impairment	20 (6.8%)
Length of Stay (Days)	2.7 (10.2)
ABG pH < 7.35	19 (6.4%)
Long Term Oxygen	112 (37.8%)
Long Term Steroids	13 (37.8%)
Cigarette Pack-Years	46.8 (29.6)



Gold Score	FEV <sub>1</sub>	Patients
Gold 1 - Mild	≥ 80% Predicted	19 (7.5%)
	≥ 50% to < 80% Predicted	
Gold 2 - Moderate		92 (36.5%)
	≥ 30% to < 50% Predicted	
Gold 3 - Severe		100 (39.7%)
Gold 4 – Very Severe	< 30% Predicted	41 (16.3%)



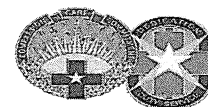
mMRC	Patients
0	35 (13.1%)
1	28 (10.5%)
2	42 (15.7%)
3	75 (28.1%)
4	87 (32.6%)





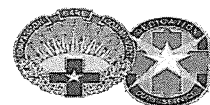
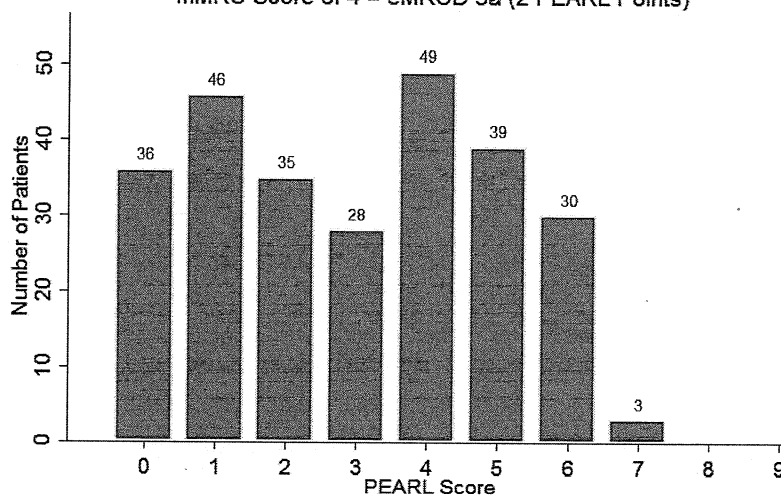
## Descriptive Statistics

Event	Patients
Readmitted within 30 days	60 (20.3%)
Readmitted within 90 days	113 (38.2%)
Death within 30 days	1 (0.3%)
Death within 90 days	5 (1.7%)

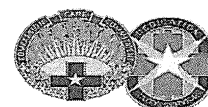
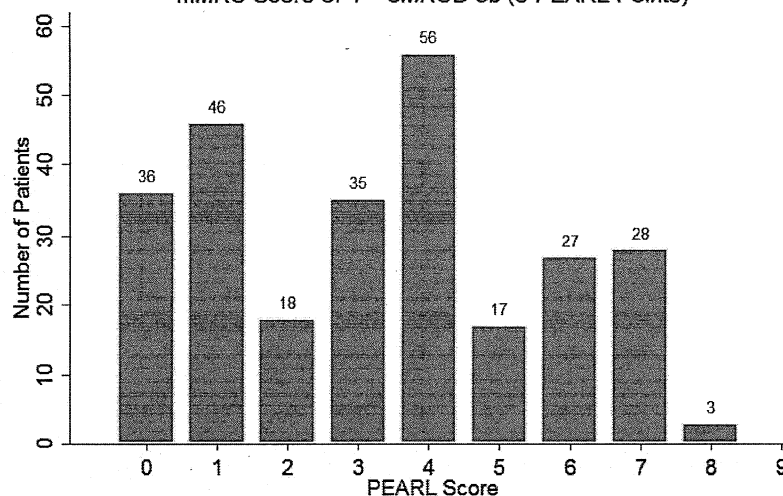


## Outcomes

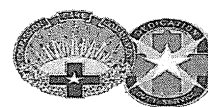
Distribution of Patients by PEARL Score  
mMRC Score of 4 = eMRCD 5a (2 PEARL Points)



Distribution of Patients by PEARL Score  
mMRC Score of 4 = eMRCD 5b (3 PEARL Points)



PEARL Risk	mMRC 4 = 2 Points	mMRC 4 = 3 Points
High	72 (27.1%)	75 (28.2%)
Intermediate	112 (42.1%)	109 (41.0%)
Low	82 (30.8%)	82 (30.8%)

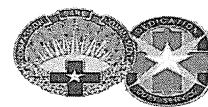


PEARL Category	mMRC 4 = 2 Points	mMRC 4 = 3 Points
Readmission at 30 Days	Significant ( $p < 0.001$ )	Significant ( $p < 0.001$ )
Readmission at 90 Days	Significant ( $p < 0.001$ )	Significant ( $p < 0.001$ )
Death at 30 Days	Not Significant ( $p = 1$ )	Not Significant ( $p = 1$ )
Death at 90 Days	Not Significant ( $p = 0.181$ )	Not Significant ( $p = 0.187$ )

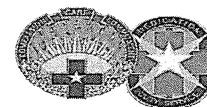


Does the modified PEARL predict readmission and death in the DoD population?

- PEARL predicted readmission at 90 days but not at 30 days
- Insufficient deaths were seen in the study population for PEARL to accurately predict them



- mMRC is an acceptable substitute for eMRCD
- PEARL may not be predictive of death in all populations



- Limitations:
  - mMRC was not explicitly stated in most outpatient notes
  - Only admissions to SAMMC assessed
  - Death is not well documented
  - Incomplete outpatient records







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## Future Direction

- Future Directions:
  - This study demonstrates that modified PEARL is a valid tool for predicting readmission at 90 days but not at 30 days or death
  - Proposed prospective cohort study
    - Target patients at high risk for readmission
    - Incorporate intensive counseling at discharge
    - Track 90-day readmission rate vs. a control groups



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## Assessment Questions

### 1. Which of the following is not a component of the PEARL Score?

- A) Previous admissions
- B) Age
- C) Right Ventricular Failure
- D) Length of Stay







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## Assessment Questions

2. According to the PEARL Score, which eMRCD score puts a patient most at risk for readmission after an acute COPD exacerbation?

- A) 1
- B) 2
- C) 5a
- D) 5b



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## A Special Thank You

- This project would not be possible without the guidance, support, and assistance of the following people:

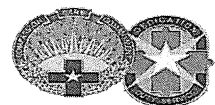
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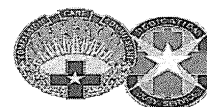
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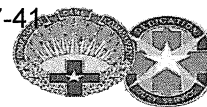


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1. Doll H, Miravittles M. Health-related QOL in acute exacerbations of chronic bronchitis and chronic obstructive pulmonary disease: a review of the literature. *Pharmacoeconomics*. 2005;23:345-63.
2. Steer J, Norman EM, Afolabi OA, et al. Dyspnoea severity and pneumonia as predictors of in-hospital mortality and early readmission in acute exacerbations of COPD. *Thorax*. 2012;67:117-121.
3. Echevarria, C, Steer J, Heslop-Marshall K, et al. The PEARL score predicts 90-day readmission or death after hospitalization for acute exacerbation of COPD. *Thorax*. 2017;72:686-693.
4. Casanova C, Marin JM, Martinez-Gonzalez CM, et al. Differential effect of modified medical research council dyspnea, COPD assessment test, and clinical COPD questionnaire for symptoms evaluation within the new GOLD staging and mortality in COPD. *Chest*. 2015;148(1):159-168.
5. Healthcare Commission. Clearing the air. A national study of chronic obstructive pulmonary disease. Commission for Healthcare Audit and Inspection, 2006.
6. Roberts CM, Lowe D, Bucknall CE, et al. Clinical audit indicators of outcome following admission to hospital with acute exacerbation of chronic obstructive pulmonary disease. *Thorax*. 2002;57:137-41.





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## References

7. Allaudeen, N, Schnipper JL, Orav EJ, et al. Inability of providers to predict unplanned readmissions. *JAMA Intern Med.* 2016;176(4):484-493.
8. Puhan MA, Garcia-Aymerich J, Frey M, et al. Expansion of the prognostic assessment of patients with chronic obstructive pulmonary disease: the updated BODE index and the ADO index. *Lancet.* 2009;374:704-11.
9. Soler-Cantaluna JJ, Martinez-Garcia MA, Sanchez LS, et al. Severe exacerbations and BODE index: two independent risk factors for death in male COPD patients. *Respir Med* 2009;13:692-9.
10. Jones RC, Donaldson GC, Chavannes NH, et al. Derivation and validation of a composite index of severity in chronic obstructive pulmonary disease: the DOSE Index. *Am J Respir Crit Care Med.* 2009;180:1189-95.
11. Vestbo J, Hurd SS, Agusti AG, et al. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: GOLD executive summary. *Am J Respir Crit Care Med.* 2013;187:347-65.

